

IN THE CLAIMS:

1. (Currently amended) A method for heat treating an article, comprising the steps of:

providing an article having a nominal composition, in weight percent, of about 4 percent aluminum, about 4 percent molybdenum, about 2 percent tin, about 0.5 percent silicon, balance titanium and impurities;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F and in the alpha-plus-beta region of a phase diagram of the article, and thereafter

first cooling the article to a temperature of less than about 800°F; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

2. (Original) The method of claim 1, wherein the step of providing the article includes the step of

providing the article having a first portion with a thickness of less than 0.2 inch and a second portion with a thickness of greater than 0.2 inch.

3. (Original) The method of claim 1, wherein the step of providing the article includes the step of

providing a gas turbine compressor blade.

4. (Original) The method of claim 1, wherein the step of processing includes the step of

forging the article at the first-heating temperature.

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5. (Original) The method of claim 1, wherein the step of processing includes the step of
forging the article at a temperature of about 1650°F.

6. (Currently amended) ~~The method of claim 1~~ A method for heat treating an article, comprising the steps of:

providing an article having a nominal composition, in weight percent, of about 4 percent aluminum, about 4 percent molybdenum, about 2 percent tin, about 0.5 percent silicon, balance titanium and impurities;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F, and thereafter

first cooling the article to a temperature of less than about 800°F, wherein the step of processing includes the step of weld repairing the article at the first-heating temperature; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

7. (Original) The method of claim 1, wherein the step of second heating includes the step of

second heating to the second-heating temperature of about 1350°F for a time of from about 4 to about 6 hours.

8. (Original) The method of claim 1, wherein the step of second cooling includes the step of

second cooling the article at the second cooling rate of from about 1°F per second to

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about 15°F per second.

9. (Original) The method of claim 1, including an additional step, after the step of second cooling, of
stress relieving the article at a temperature of from about 1000°F to about 1050°F.

10. (Original) The method of claim 1, wherein the step of second heating includes a time of from about 4 to about 6 hours at the second-heating temperature.

11. (Original) The method of claim 1, wherein the step of second heating includes the step of
wrapping the article in a foil selected from the group consisting of commercially pure titanium foil and tantalum foil.

12. (Currently amended) A method for heat treating an article, comprising the steps of:

providing an article formed of an alpha-beta titanium-base alloy;
processing the article to form a martensitic structure therein, the step of processing including the steps of
first heating the article to a first-heating temperature of greater than about 1600°F and in the alpha-plus-beta region of a phase diagram of the article, and thereafter
first cooling the article to a temperature of less than about 800°F; thereafter
second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter
second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

13. (Original) The method of claim 12, wherein the step of providing the article includes the step of
providing the article formed of the alpha-beta titanium-base alloy having more than

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about 3.5 weight percent molybdenum.

14. (Original) The method of claim 12, wherein the step of providing the article includes the step of

providing the article having a first portion with a thickness of less than 0.2 inch and a second portion with a thickness of greater than 0.2 inch.

15. (Original) The method of claim 12, wherein the step of providing an article includes the step of

providing a gas turbine compressor blade.

16. (Original) The method of claim 12, wherein the step of processing includes the step of

forging the article at the first-heating temperature.

17. (Currently amended) The method of claim 12 A method for heat treating an article, comprising the steps of:

providing an article formed of an alpha-beta titanium-base alloy;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F, and thereafter

first cooling the article to a temperature of less than about 800°F, wherein the step of processing includes the step of weld repairing the article at the first-heating temperature; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

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18. (Original) The method of claim 12, wherein the step of second heating includes the step of

second heating to the second-heating temperature of about 1350°F for a time of from about 4 to about 6 hours.

19. (Original) The method of claim 12, including an additional step, after the step of second cooling, of

stress relieving the article at a temperature of from about 1000°F to about 1050°F.

20. (Original) The method of claim 12, wherein the step of second heating includes a time of from about 4 to about 6 hours at the second-heating temperature.

21. (Currently amended) The method of claim 17 12, wherein the step of second heating includes the step of

wrapping the article in a foil selected from the group consisting of commercially pure titanium foil and tantalum foil.

22. (New) A method for heat treating an article, comprising the steps of:

providing an article formed of an alpha-beta titanium-base alloy and having a first portion with a thickness of less than 0.2 inch and a second portion with a thickness of greater than 0.2 inch;

processing the article to form a martensitic structure therein, the step of processing including the steps of

first heating the article to a first-heating temperature of greater than about 1600°F, and thereafter

first cooling the article to a temperature of less than about 800°F; thereafter

second heating the article to a second-heating temperature of from about 1275°F to about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second cooling rate that does not exceed about 15°F per second.

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23. (New) A method for heat treating an article, comprising the steps of:
providing an article formed of an alpha-beta titanium-base alloy;
processing the article to form a martensitic structure therein, the step of processing
including the steps of

first heating the article to a first-heating temperature of greater than about
1600°F, wherein the step of processing includes the step of forging the article at the first-
heating temperature, and thereafter

first cooling the article to a temperature of less than about 800°F; thereafter
second heating the article to a second-heating temperature of from about 1275°F to
about 1375°F for a time of from about 1 to about 7 hours; and thereafter

second cooling the article to a temperature of less than about 800°F at a second
cooling rate that does not exceed about 15°F per second.

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